

CLAIMS

1. A method for inspecting a semiconductor wafer surface, comprising the steps of scanning a wafer with a laser beam, detecting a scattered or reflected light from the wafer surface by multiple light optics having different detecting angles to an incident light, and classifying the defect into some characteristics based on the ratio of the detected light intensities from the multiple light optics.

2. A method for inspecting a semiconductor wafer surface, comprising the steps of scanning a wafer with a laser beam, detecting a scattered or reflected light from the wafer surface by multiple light optics having different detecting angles to an incident light, calculating a difference between a horizontal length and a vertical height or between a horizontal length and a horizontal length crossing at right angles of a LPD (Light Point Defect) present on the wafer surface from a difference in the standard particle conversion sizes based on the ratio of the detected light intensities from the multiple light optics, and determining the forms and types of defects and the like present on the wafer surface.

3. A method for inspecting a semiconductor wafer surface according to Claim 1 or 2, wherein a laser surface inspection apparatus having at least two light optics to one incidence is used as a laser surface inspection apparatus.

4. A method for inspecting a semiconductor wafer surface according to any of Claims 1-3, wherein the semiconductor wafer is an epitaxial semiconductor wafer.

5. A method for inspecting a semiconductor wafer surface according to any of Claims 1-4, wherein the forms and types of defects and the like are determined depending on a combination of A, B, and a value given by A/B, where the detected light intensity or standard particle conversion size of a LPD (Light Point Defect) detected in a high-angle light optic is A, while the detected light intensity or standard particle conversion size of the LPD detected in a low-angle light optic is B.

6. A method for inspecting a semiconductor wafer surface according to any of Claims 1-4, wherein the forms and types of defects and the like are determined based on Table 1, where the standard particle conversion size of a LPD (Light Point Defect) detected in a high-angle light optic is A, while the standard particle conversion size of the LPD detected in a low-angle light optic is B.

Sub
A
-
100
-
500
-
1000

Sub
A1
conc.

Table 1

Relations between A and B or ranges	Actual for ms
$A \geq B \times 1.13$	Stacking Fault
$A < B \times 1.13$	Non-epi-layer originated extraneous substance (adherent particle)
$B < 90 \text{ nm}$ and $A > 107 \text{ nm}$	Micro-crystallographic-defect (hillock, shadow, dislocation)
$B > 160 \text{ nm}$ and $A < 107 \text{ nm}$	Abnormal growth (large-pit, projection)
Others	Abnormal product

7. A method for inspecting a semiconductor wafer surface according to any of Claims 1-3, wherein the semiconductor wafer is a mirror-finished semiconductor wafer.

8. A method for inspecting a semiconductor wafer surface according to Claim 7, wherein the forms and types of defects and the like are determined depending on a combination of A, B, and a value given by A/B, where the detected light intensity or standard particle conversion size of a LPD (Light Point Defect) detected in a high-angle light optic is A, while the detected light intensity or standard particle conversion size of the LPD detected in a low-angle light optic is B.

9. A method for inspecting a semiconductor wafer surface according to any of Claims 1-3 and 7, wherein the forms and types of defects and the like are determined based on Table 2, where the standard particle conversion size of a LPD (Light Point Defect) detected in a high-angle light optic is A, while the standard particle conversion size of the LPD detected in a low-angle light optic is B.

Table 2

Relations between A and B or ranges	Actual for ms
$A \geq B \times 1.13$ or $B < 90 \text{ nm}$ and $A > 107 \text{ nm}$	Scratch, flaw, and shallow pit
$A < B \times 1.13$	Adherent particle or COP
$B \leq 85 \text{ nm}$ and $A < 107 \text{ nm}$	Grown-in defect in bulk near surface

ADD
A3

add
B1>